The systematic position of the ignote tribe Lachnogyini Reitter, 1904, with comments on the evolution of the aedeagus in the subfamilies Pimeliinae and Opatrinae

(Insecta, Coleoptera, Tenebrionidae)

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This paper deals with the systematic position of the Central Asiatic tribe Lachnogyini, that was previously placed in the subfamily Tenebrioninae near the tribe Opatrini. A revision of available types belonging to the genera of this tribe indicates that the position of the Lachnogyini is within the subfamily Pimeliinae. The systematic position of the genus *Lachnodactylus* Reitter, 1904, is in the subfamily Diaperinae, tribe Trachyscelini. The evolution of the aedeagus in the subfamilies Pimeliinae and Opatrinae is discussed and illustrated.

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Introduction

The higher classsification of the Coleoptera Tenebrionidae has been discussed recently by Iwan (2001), who reestablished the validity of the subfamily Opatrinae sensu Mevdeved (1968) that was degraded to tribal level by Doyen & Tschinkel (1982).

The tribe Lachnogyini was created by Reitter (1904) to receive two monotypic, central asiatic genera and species: *Lachnogya squamosa* Ménétriés, 1849, from Turkestan and Afghanistan and *Netuschilia hauseri* (Reitter, 1897) described under the preoccupied name *Lachnopus*, from Buchara. The tribe was posteriorly increased with another three genera: *Kleweria colydiiformis* Reitter, 1910 from Transcaspia and *Lachnodactylus digitatus* (Seidlitz, 1898) from Turkmenistan, previouly placed by Reitter (1904) in the Trachyscelini, and a synonym of the common African opatriine *Phitamnus sericans* Fairmaire, 1870, redescribed as *Canariella arenapta* by Uyttenbogaart (1929) from the Canary Islands.

The representatives of this tribe are extremely rare in all collections and confined to the arid steppes of the Central Asian region from Transcaucasia, Turkmenistan, Afghanistan to the desert regions of China.

During a recent French expedition to a remote locality in the cold Desert of Taklamakan, in the Xing Kiang Province, China, a French archeologist, Mr. Sebastian Lepetz, found under an excavation a tenebrionid beetle which was sent to me for study by Mr. Jean Hervé Yvinec, a French archeologist and practising entomologist.

I was puzzled searching for a systematic position of this hitherto unknown insect. The only possible option, according to the available literature, was to place this species in the tribe Lachnogyini, which finally was revised under this research. The specimen from the French expedition to Xing Kiang was compared with type material of all previous known genera of the Lachnogyini and found to be a new representative of the tribe. However, this species, new for science, has to be placed in a new genus, that was created to receive it and will be described in a separate paper in preparation, together with Mr. Jean Hervé Yvinec.

In the first Catalogue of Tenebrionidae (Gebien 1910) the tribe Lachnogyiini was placed after Epitragini, between other tribes of the subfamily Tentyriinae, but, after several changes, all genera were placed by Reitter and Gebien in an own tribe, after the tribe Opatrini sensu Gebien (1939), and were placed at this time in the subfamily Tenebrioninae. Gebien (loc. cit.) noted that Lachnogyiini was considered in his Catalogue a provisional group, composed by "heterogenere Gattungen", which successively were transferred by Reitter to very different tribes, e.g. Leptodini, Trachyscelini and Blaptini.

Several tribes from Gebien's Catalogue (1939), were transferred by later authors to an own subfamily, the Opatrinae *sensu* Medvedev (1968). This classification was rejected by Doyen & Tschinkel (1982), was but finally adopted by Iwan (2001), who redefined the subfamily Opatrinae auct. based on the special configuration and position of the aedeagus.

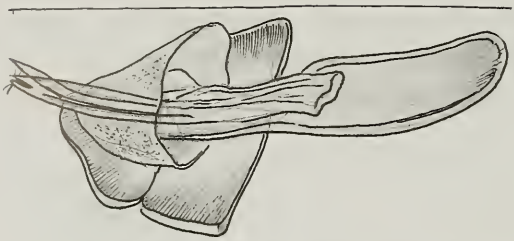

Fig. 1. Derivative, apomorphic position of the male copulatory organ in Pimeliinae. Aedeagus of *Moluris muata* Harold, from Namibia. Scale bar: 1.3 mm.

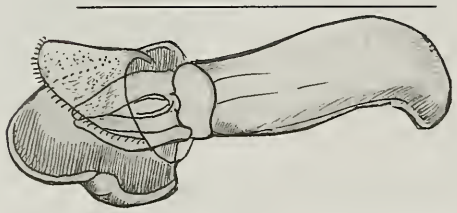

Fig. 2. Primitive, normal position of the male copulatory organ in Opatriinae. Aedeagus of *Opatrum sabulosum* Linné, from Italy. Scale bar: 0.7 mm.

Fig. 3. Derivative, apomorphic position of the male copulatory organ in Lachnogyini. Aedeagus of *Lachnogya squamosa* Ménétriés. Scale bar: 0.6 mm.

Results

Examination of the aedeagus of the new genus and species from Taklamakan and of the genotypic species *Lachnogya squamosa* Ménétries reveal that the choice of Reitter (1904) and Gebien (1939), who transferred the genera *Lachnogya*, *Netuschilia*, and *Kleweria* to the subfamily Opatrinae, was inadequate, because of the ventral exposition in dorsal view, of the male copulatory organ, the aedeagus. The initial choice of Reitter (1904), however, who placing *Lachnodactylus* within the tribe Trachyscelini, was correct.

In a cladistic analysis towards a new higher classification of Tenebrionidae, Doyen & Tschinkel (1982) concluded that the dorsal position, i.e. the ventral side of the aedeagus being contiguous to the abdominal sternites, is the normal, primitive position in Coleoptera, the plesiomorphic status of the male copulatory organ. In Opatrinae, however, the aedeagus exhibits a "rotated" position, in which the dorsal face is visible from dorsally, and the ventral side is contiguous to the inner surface of the abdominal sternites (Fig. 2). This position is considered a derived, apomorphic status.

In fact, the contrary is true: the normal position of an organ – be it a hand or an aedeagus – is with the dorsal face exposed dorsally. The rotation of a member exhibiting the ventral face dorsally (Figs 1, 3), is a very unusual, evolved, apomorphic state. The goal of this evolution is probably a configuration of the genitalia, in which the disposable space of the abdominal cavity is increased, to dispose the aedeagus completely contiguous to the surface of the abdomen, to reduce the empty space, to permit a dilatation of the ventral sack to accumulate food and to increase humidity, by means of reduction of evaporation under the elytra. These adaptative apomorphic states are characteristic for such a xerophilous subfamily as Pimeliinae, that generally live in extreme arid, desert habitats, e.g. the tribes Molurini, Tentyrini, Adesmiini, Stenosini, Asidiini, Pimeliini, etc. from African dry savannas and deserts, and likewise the Central Asiatic Lachnogyini.

The new representative of Lachnogyini, possesses an aedeagus that is similar to those of several genera of Pimeliinae (Figs 1, 3), which indicate that the Lachnogyini, hitherto placed within Opatrinae, have to be transferred. This is the consequence of several features that are absent in the genera of the subfamily Opatrinae: absence of a clypeo-genal incision; the habitual aspect of a relative of Ulomini; the median and posterior legs finely spinose and elongate, as in the genera of Zoophosini and Crypticini; and of course, the rotated aedeagus. Special characters of Lachnogyiini resulting from convergent evolution, are the long pubescence covering the sides of the body and the very dilated protibiae, which are similar to some psammophile genera of Opatrini.

Examination of *Lachnodactylus digitatus* Seidlitz indicates that this genus has to be retransferred to the tribe Trachyscelini, today placed in the subfamily Diaperinae, because a combination of various different characters, as the club of antennae, the short, massive legs, well adapted to digging, but unable to run, and the simple position of the aedeagus with the dorsal surface being exposed dorsally.

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The genus *Scaurus*: Biogeography and Ecology

(Insecta, Coleoptera, Tenebrionidae)

Harold Labrique

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Ecological and biogeographical parameters of the mediterranean genus *Scaurus* are discussed. The high grade of endemism is tressed and it is shown that most taxa live at low altitudes and preferably in regions with a mediterranean bioclimate.

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The genus *Scaurus* Fabricius actually contains 30 species and 8 subspecies. This genus ranges around the Mediterranean basin with the exception of the Balkans and Asia minor where it is replaced by the genus *Cephalostenus* Solier. Like many other tenebrionid beetles living around the Mediterranean Sea, species of Scaurus are wingless. Most species are twilight or nocturnal beetles and, during the day, many are hidden under stones.

The genus *Scaurus* presents different types of distribution: betico-rifenian (such as *S. tingitanus* Peyerimhoff (f. typ.), maghrebian (such as *S. sancti-amandi* Solier), north-west mediterranean (such as *S. striatus* Fabricius), saharo-mediterranean (such as *S. aegyptiacus* Solier), turanian (such as *S. puncticollis* ssp. *macricollis* Allard), etc.

There are two interesting regions where the diversity is remarkable. The first one is the tripolitano-cyrenaïc region with 5-6 occurring species. In this region, *Scaurus sancti-amandi* Solier reaches his eastern limit of distribution and *S. carinatus* ssp. *vicinoides* Schuster reaches his western limit. The second region includes north-eastern Marocco and west-eastern Algeria with altogether 11-12 species occurring. In this region, some species reach their western limit of distribution (*S. varvasi* Solier, *S. angustus* Reiche, *S. atratus* Fabricius and *S. dubius* Solier) and others their eastern limit (*S. vicinus* Solier and *S. mesatlanticus* Peyerimhoff). One species is endemic in this region: *S. camelus* Kocher. Generally, the orano-maroccan block has a high diversity with several endemic species.

Concerning endemism, this is very important in the genus. Among the 38 known taxa, 23 could be considered as endemic, that is about 60.5 %. For example, in Marocco live 22 taxa and among these 11 are endemic, that is 50 % of all taxa living in this country and about 50 % of all endemic taxa. This richness of the maroccan fauna could be explained by the high diversity of habitats in this country.

Concerning the ecology of the species of the genus *Scaurus*, it can be stated that most taxa (66 %) inhabit areas with mediterranean bioclimate and only 4 taxa strictly inhabit the desert region. A morphological and phylogenetic study showed that the genus *Scaurus* can be divided into three lineages: the *Scaurus angustus* lineage (1 species), the *Scaurus tristis* lineage (24 taxa) and the *Scaurus punctatus* lineage (13 taxa). If we remove *Scaurus angustus* which is a very particular species, we could argue